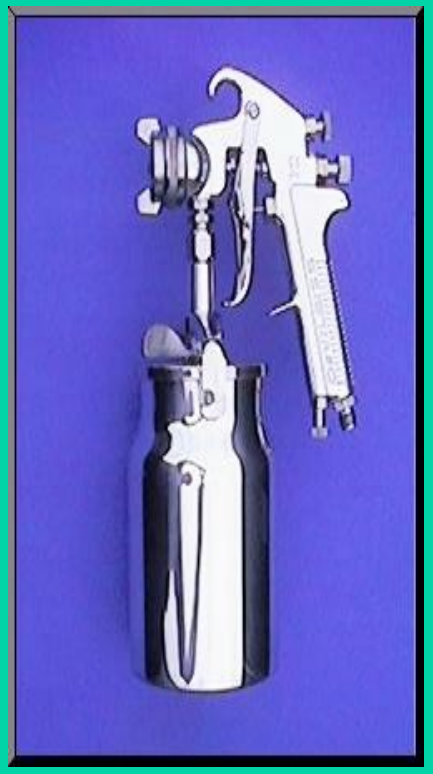
SPRAY PAINTING OPERATIONS



ENABLING OBJECTIVES

- DESCRIBE the Gas Free Engineering requirements for performing spray painting in confined spaces
- DESCRIBE the hazards and safety precautions associated with spray painting
- DESCRIBE the gas free testing required prior, during, and after spray painting operations in a confined space

REFERENCES

- NSTM CH 074 VOL 3 *GAS FREE ENGINEERING*
- NSTM CH 631 VOL 1-3 Chapter C18 *PRESERVATION OF SHIPS IN SERVICE*
- NWP 3-20.31 *SURFACE SHIP SURVIVABILITY*
- NSTM CH 074 VOL 1 *WELDING & ALLIED PROCESSES*
- OPNAVINST 5100.19C NAVOSH PROGRAM MANUAL

Spray Painting

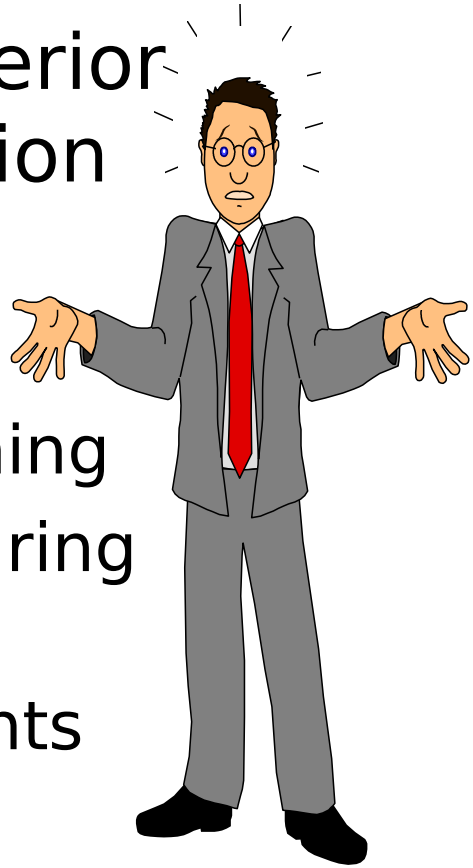
- Performed to preserve and protect the ship’s interior spaces
- Principal hazard is the paint, its components, and the form in which it is applied
- Spray gun produces airborne contaminants
  - Vapors, mists, and aerosols
- OSHA regulates worker exposure and the PPE standard

Spray Painting

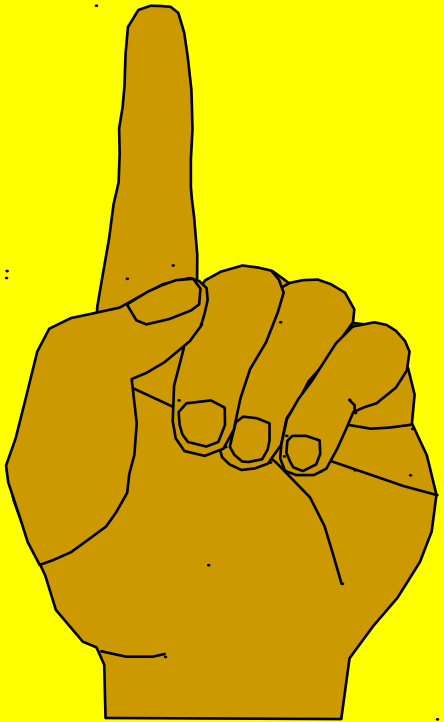
- More hazardous than brush application due to:
  - Volume of material being applied
  - Flammable residue deposited by spraying which might spontaneously combust
  - Harmful toxic mists created by spraying

What does the GFE have to do with Spray Painting?

- Ensure you are notified of any interior spray painting *prior* to the operation
- This allows you to:
  - Ensure operating personnel set up ventilation properly and keep it running
  - Ensure space is monitored for CO during and *after* completion
  - Consider LEL/Vapor Volume of solvents involved per 074 Vol. 3 page 21-10



SAFETY IS YOUR NUMBER ONE PRIORITY



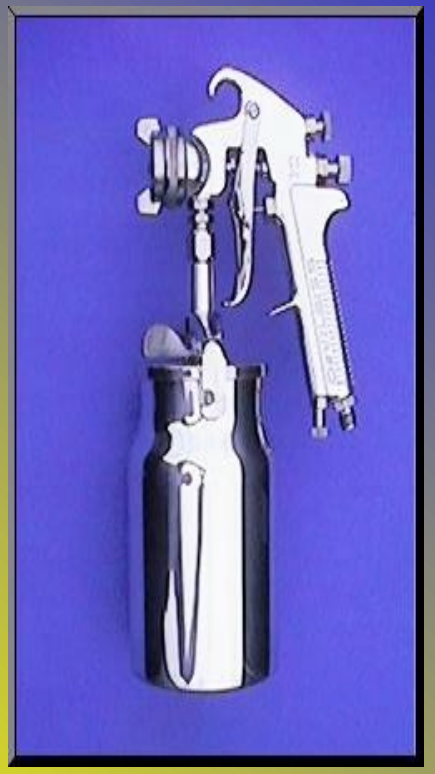
Safe Painting Operations

Two most important factors:

① Responsibility of Supervisors and Operating Personnel
- Obtain Gas Free Engineer's Approval prior to commencing painting
- Ensure GFE is advised when ventilation is secured after painting is completed
- Gas Free Engineer provides technical assistance (ventilation set up, PPE) as needed in addition to gas free testing

② Training

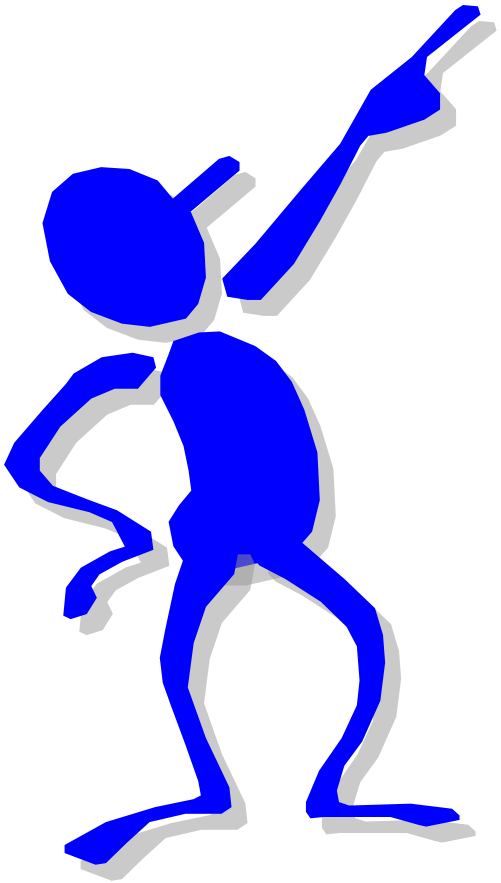
PRIOR TO PAINTING



“For contaminating operations…within a confined or enclosed space, the (GFE) certificate shall specify applicable requirements such as ventilation, PPE, respiratory protection, explosion proof and sparkproof equipment and suitable fire protection equipment.”

NSTM 074 VOL 3

Basic Safety Guidelines

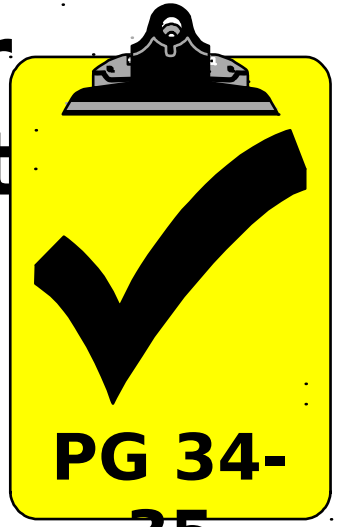


- **Always protect your crew against the *three major hazards:***

1. ***Mishaps***
2. ***Fire***
3. ***Toxicity***

Basic Safety Guidelines

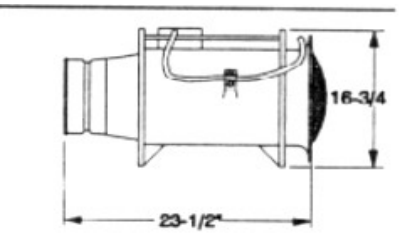
- **Ensure the work supervisor uses a safety checklist**

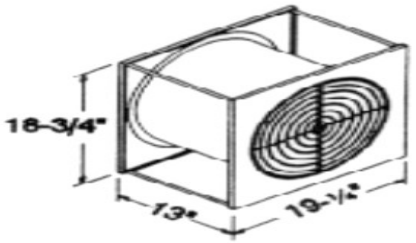


- **An example is provided in NSTM 631 Vol. 1 *“Preservation of Ships in Service”***

VENTILATION Requirements

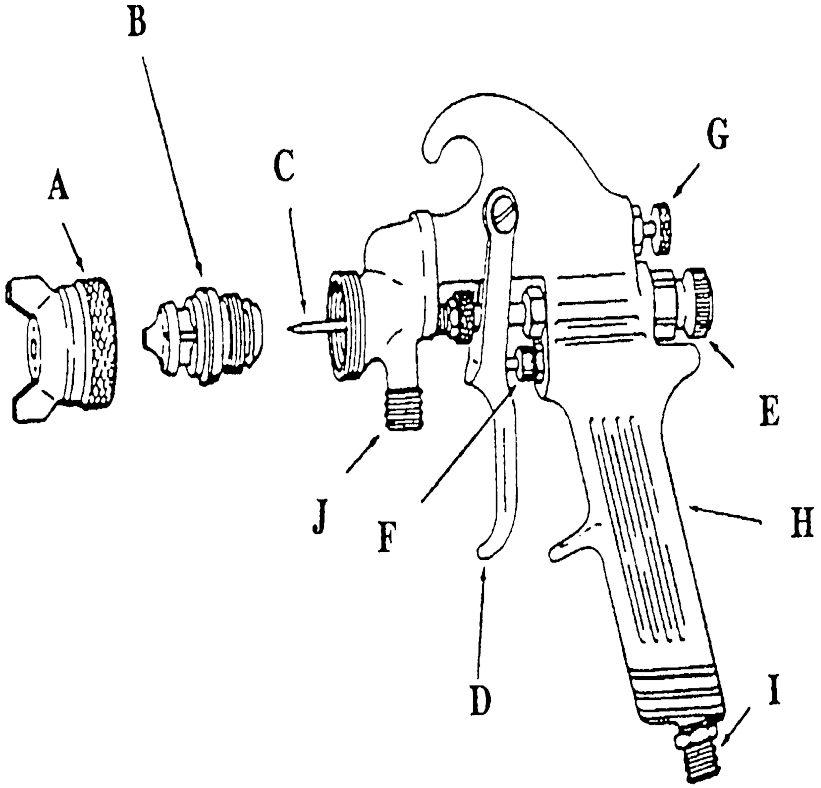
- Required to control the toxic and flammability hazard
- Use *dilution*-type ventilation to protect adjacent areas
  - Ensures vapor concentrations remain below 10% of the LEL
- Run ventilation continuously
- Continue ventilation for at least *one hour* after painting is completed





Spray Nozzle

- Adequate ventilation does not preclude accumulation of explosive concentrations within limited areas adjacent to spraying
- Explosive concentration area does not extend more than 5 feet from the nozzle in all directions



Training Qualifications

- Personnel must understand the hazards and protection requirements as they relate to the type and application process of the paint being used

General Safety Measures

- Potential hazards that exist in all spray painting operations make a continuing and enforced safety program essential
- Check the following areas:
  - Work Environment
  - Buddy System
  - Communication
  - Ventilation Requirements
  - PPE Requirements

Work Environment

- Study the area before painters are sent into the area
- Consider the following hazards:
  - Poor ventilation
  - Noxious fumes
  - High temperatures
  - Type of material and how it is applied
  - Type of space

Buddy System - Communications - Supervision

- Personnel shall never work alone in hazardous areas
- Communications should be maintained
- Operation should be supervised
- Ensure you state on the Gas Free Certificate:

“Observe Two Man Rule”

“Set up communications as follows:”

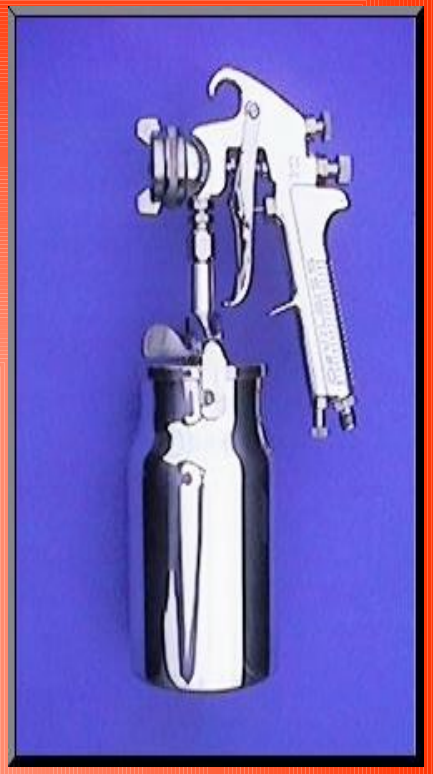
Personnel Protection Equipment (PPE)

- Always use explosion-proof lamps
- Wear coveralls, chemical goggles, gloves, and barrier creams to exposed areas of body
- Wear approved respirators when spraying (supplied air), mixing (organic vapor as a minimum) or handling

Danger Area

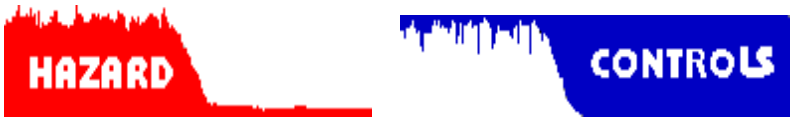
- Post signs and rope off area to warn others of areas where there is a possibility of vapors
- Danger area shall extend a minimum of 25 feet from the painting operation
  - NSTM 631 Vol. 1

GAS FREE ENGINEER INSPECTION



APPLICATION OF PAINT IN A CONFINED SPACE

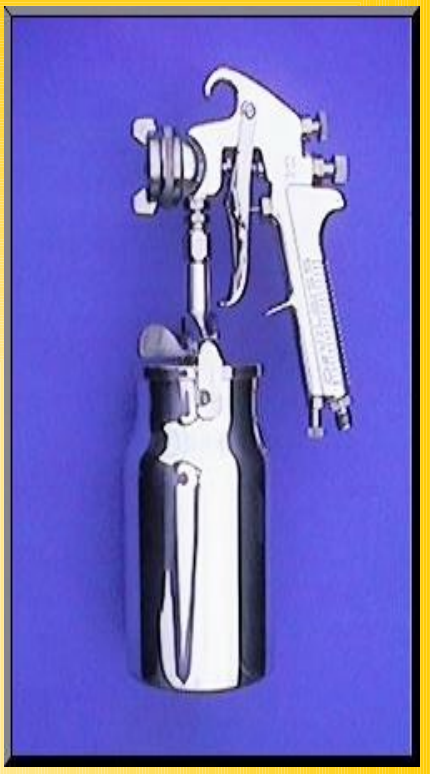
- Conduct periodic gas free tests
  - ➡GFE conducts the initial test
  - GFEA/GFEPO conduct retesting
- Conduct testing during work breaks
  - Exhaust side of portable ventilation
  - Air intakes



CHECK FOR OR STATE THE FOLLOWING:

- **Type of ventilation to be used**
- **How you want ventilation set up**
  - **Spell this out on your Gas Free Chit**
- **Ensure all DC numbers and plates are covered or numbers & location are recorded**
- **Type of respiratory protection**
  - **Spell this out on your Gas Free Chit**
- **Type of PPE to use**
  - **Spell this out on your Gas Free Chit**

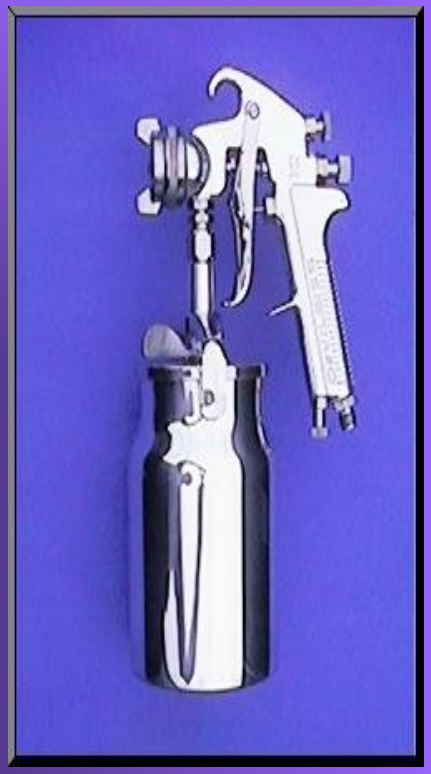
DURING PAINT OPERATIONS



DURING PAINT OPERATIONS

- Never test levels at the nozzle of spray gun
  - Receive inaccurate readings
  - Ruin GFE equipment
- Only one day’s paint can be in a space at any one time

POST PAINT ING CONCERNS



POST PAINTING CONCERNS

- Ventilation should run for 1 hour after job completion
- Ensure DC labels & plates are restored correctly!!!
- Clean respirators & dispose of hazardous material properly
- ***10 minutes after ventilation shutdown, ensure space is gas free***

Requirement from OPNAVINST 5100.19C (C18)

"Wear supplied air respirators when engaged in spray painting operations internal to the ship or in confined external areas…"

(Realize that 631 and 5100.19C differ on this issue. NSTM 631 only requires supplied air for Vinyl and Epoxy paints.

Always err on the side of SAFETY!!

Spray Painting Operations
LT 7.15 Review

- Review and have a working knowledge of the following Publications:

NSTM CH 631 V1-3 “Preservation of Ships”

NSTM CH 074 3 “Gas Free Engineering”

OPNAVINST 5100.19C “Safety Manual”

“VENI, VIDI, VENTILATE!!!”

Loosely translated means

“Ventilate, Ventilate, Ventilate!!!”

THE END